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BULLETIN NO. 03-5

BULLETIN

Date: **November 2003**
Revised: **December 2005**

Subject: **Special Inspections**

Reference: **N.J.A.C. 5:23-2.20(b), N.J.A.C. 5:23-3.14**

The 2000 edition of the International Building Code (IBC/2000) was adopted on May 5, 2003 as the Building Subcode of the Uniform Construction Code (UCC). The adoption of the IBC/2000 incorporates Chapter 17, entitled "Structural Tests and Special Inspections," as modified by N.J.A.C. 5:23-3.14. As per N.J.A.C. 5:23-2.20(b), for purposes of this chapter of the Building Subcode, a special inspection is an independent verification by a qualified person (special inspector) rendered to the code official for **Class I buildings only**. The special inspector is to be independent so that there is no possible conflict of interest. A summary of the special inspections provisions is included to better explain the requirements of the code.

Chapter 17 of the IBC/2000 expands the requirements found in the previous edition of the Building Subcode [the 1996 edition of the Building Officials and Code Administrators (BOCA) National Building Code] for structural tests and special inspections. The UCC adds additional tests and special inspections requirements for New Jersey that are not currently covered by the IBC/2000. Certain special inspections required by Chapter 17 of the IBC/2000 were deleted upon adoption because in New Jersey they are the responsibility of the construction official.

Approved Special Inspection Agencies: Agencies of this nature are regularly engaged in conducting special tests or inspections. Very often, they specialize in one aspect of the construction industry, due to the complexity of construction. This is why a special inspector who is trained in a specific area may be needed to conduct certain inspections. Special inspectors are independent of the contractor and responsible to the building owner or building owner's agent. The established and recognized special inspector, or special inspection agency proposed by the permit applicant for each special inspection, must be acceptable to the construction official.

Building Permits and Reports: The permit applicant is required to submit a statement of the special inspections to be performed at the time of application. The statement is to be prepared by the design professional.

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Structural Systems: Special inspections are required for the following as per the corresponding sections of the Building Subcode.

* *Fabrication of Structural Load-Bearing Members/Assemblies*, Section 1704.2: These inspections are normally handled through an in-plant, quality-control process and reports are forwarded to the local construction code office when the elements are delivered.

* *Steel Construction*, Section 1704.3: This section requires the inspection of certain aspects of the on-site erection of steel including welding, high-strength bolting, and joint connection details with specific exceptions listed.

* *Concrete Construction and Masonry Construction*, Sections 1704.4 and 1704.5: These sections address the placement of structural concrete and masonry elements.

* *Soils*, Section 1704.7: A soils report required as per Section 1802.0 of the Building Subcode is used to determine compliance with the placement of load-bearing fill.

* *Pile Foundations*, Section 1704.8: This section requires inspections during the driving of pile foundations.

Finishes:

* *Wall Panels and Veneers*, Section 1704.10: The State of New Jersey does not contain Seismic Design Categories E or F; therefore, no special inspection is required for exterior or interior architectural wall panels, or the anchoring of veneers.

* *Sprayed, Fire-Resistant Materials*, Section 1704.11: Special inspections are required for sprayed, fire-resistant materials applied to structural elements and decks. Details include structural member surface conditions, application, thickness, density, and bond strength.

* *Exterior insulation and finish systems (EIFS)*, Section 1704.12: Special inspections are required for all EIFS applications. Exceptions: installations over a water-resistive barrier, or over masonry or concrete walls.

Special Inspection for Smoke Control: A special inspector, qualified as per Section 1704.14.2 of the Building Subcode, is required to test smoke control systems. The inspector inspects for leakage testing, recording of device location, pressure difference testing, flow measurements, and detection and control verification.

Quality Assurance for Seismic Resistance: A quality assurance plan for seismic resistance is required for Seismic Design Category D buildings[1]. This includes a plan prepared by a design professional that shows the design of each designated seismic system. The quality assurance plan identifies the seismic designated systems and seismic-force-resisting systems. Sections 1705.1 and 1705.2 of the Building Subcode contain the required quality assurance seismic systems and the required plan information.

Special Inspections for Seismic Resistance: Special inspections are required for seismic-force-resisting systems; designated seismic systems; and architectural, mechanical, and electrical components in Seismic Design Category D buildings[1]. The following components are special inspections related to seismic resistance found in Section 1707 of the Building Subcode.

* *Structural Steel*
* *Structural Wood*
* *Cold-Formed Steel Framing*
* *Architectural Components*
* *Mechanical and Electrical Components*
* *Seismic Isolation Systems*
* *Storage Racks and Access Floors*

Structural Testing for Seismic Resistance: Prior to construction, all materials and assemblies used for isolation damping systems in Seismic Design Category D buildings[1] are required to be tested and verified as per Section 1708 for seismically isolated structures.

Special Cases: N.J.A.C. 5:23-2.19(a) authorizes the building subcode official to require special inspections for proposed work that is unusual in nature. Some examples include alternative construction materials and systems, unusual design applications of materials, and materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained or referenced in the Building Subcode.

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[1]In New Jersey, the only buildings that fall into Seismic Category D are those with an importance factor of Category III on Table 1604.5 such as hospitals, fire and police stations, aviation control towers, etc. Figures 1615(1) and 1615(2) each display a map for the earthquake ground motion for the United States. Figure 1615(1) shows that New Jersey has a maximum of 0.430g for short-period acceleration (0.2 seconds). Figure 1615(2) shows that New Jersey has a maximum of 0.095g for one-second acceleration. These numbers are to be used in the equations found in Section 1615.1.2, with the results then used in Section 1615.1.3. The final results from Section 1615.1.3 shall be compared with their corresponding value from Table 1616.3(1) for short-period accelerations and Table 1616.3(2) for one-second accelerations. (As per 1615.1.1, when the soil properties are not known in sufficient detail to determine the site class, Site Class D shall be used unless the building official determines that Site Class E or F soil is likely to be present at the site.)

Short-period accelerations → S_S = 0.430g [maximum from Figure 1615(1)] and F_a = 1.544 [from Table 1615.1.2(1) using Site Class D soil]

$S_{MS} = F_a S_S = 1.544 \times 0.43 = 0.664g$

$S_{DS} = 2/3\ S_{MS} = (2/3) \times 0.664 = 0.443g$

Table 1616.3(1) = Seismic Design Category D

One-second period accelerations → S_1 = 0.095g [maximum from Figure 1615(2)] and F_V = 2.4 [from Table 1615.1.2(2) using Site Class D soil]

$S_{M1} = F_V S_1 = 2.4 \times 0.095 = 0.228g$

$S_{D1} = 2/3\ S_{M1} = (2/3) \times 0.228 = 0.152g$

Table 1616.3(2) = Seismic Design Category C

Here, there are two Seismic Design Categories listed; however, the more severe category is followed for design, therefore making most of northern New Jersey fall within Seismic Design Category D for Category III buildings.